



# Maintenance, Construction & Secondary Roads

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- State versus local responsibility
- Division structure
- Allocations
- Flexibility in funding
- Implications of not fully funding



- State versus local responsibility



# North Carolina State Highway System

NCDOT responsible for the Planning, Design, Construction, Maintenance and Operation of...

- 79,478 road miles
  - Approximately 15,000 primary
  - Approximately 64,000 secondary
- 170,947 paved lane miles
- 4,357 miles of unpaved roads
- 18,265 structures
  - 91.4 M square feet bridge deck area
- 9,000 signals



In accordance with Work Program, Principals of Asset Management, Targeted Levels of Service







# Municipal Street Aid - Powell Bill Funds

- Funds allocated from the Highway Fund and Highway Trust Fund to provide financial assistance for municipal maintained streets

FY 2012 - \$142.5 Million (\$89.5M HF/\$53.3M HTF)

FY 2013 - \$129.5 Million (\$90.2M HF/\$49.3M HTF)

- Eligible activities
  - Construction and Maintenance
  - Sidewalks & bike lanes
  - Traffic Control Devices
  - Municipal Street Bond Debt Service





# Municipal Street Aid - Powell Bill Funds

- Allocation – 75% Population + 25% Miles
- Strong incentive to grow in population, less of incentive to add miles to their system

General Statutes revisions July-2011 making municipalities with no road mileage ineligible





# County Responsibility

- Zero miles for maintenance/operations
- Concur with expenditures of Secondary Road Construction Program (G.S. 136-44.7)
- Can provide funds for improvements on the state highway system (G.S. 66.3)





- Division structure





# History of NCDOT Division Structure

- In 1915, State Highway Commission created 10 districts based on funds and mileage
- In 1919, districts adjusted from 10 to 7 by State Highway Commission (federal aid was to 4 Divisions)
- In 1921, General Assembly adjusted districts from 7 to 9 based on road miles, population and land area
- In 1930, General Assembly adjusted districts (became 5 Divisions with 5 districts each)
- In 1937, Governor's Office increased Division number to 10
- In 1950's, General Assembly authorized a study group and Divisions were reorganized to 14 in number based on miles and geography





## Recent Division Boundary Consideration

- Internal study in 1998 looked at aligning divisions with MPOs. MPO boundaries are dynamic. Found that realignment would be disruptive to operations.
- In 2007 NCDOT hired McKinsey & Company to review NCDOT. After an in-depth look at the organization, based on significant internal and external stakeholder feedback, over 30 strategic recommendations were made as to how to improve NCDOT. After reviewing McKinsey's initial recommendation for centralized expertise and decentralized delivery and consultation with McKinsey's worldwide resources, it was determined that the current structure was consistent with this model and Division realignment was not among McKinsey's final recommendations.





## Division Boundary Consideration

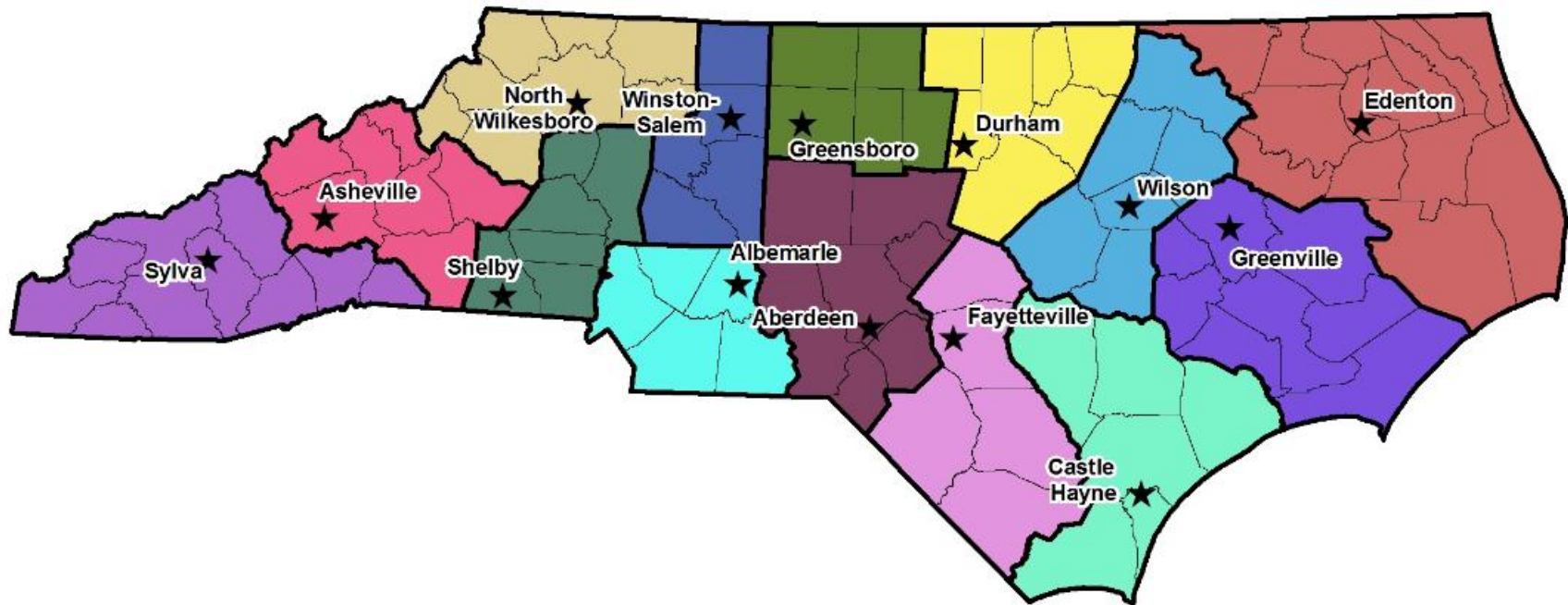
- The primary purpose of the Highway Division is to maintain and operate the elements of the state highway system.
- In the 1950's NCDOT went from 10 to 14 divisions. This provided a fair and equitable administration of a representatively equal number of miles of roads with a physical presence that would have been as close as if the counties were to have responsibility for the roads and an organizational structure that efficiently utilized personnel and materials.
- As in their earliest days, NCDOT's current division boundaries continue to be based on efficient maintenance and operations based on geography and road mileage. In 2012, NCDOT Division staffing levels are based on the number of employees and pieces of equipment necessary to achieve the desired outcomes.







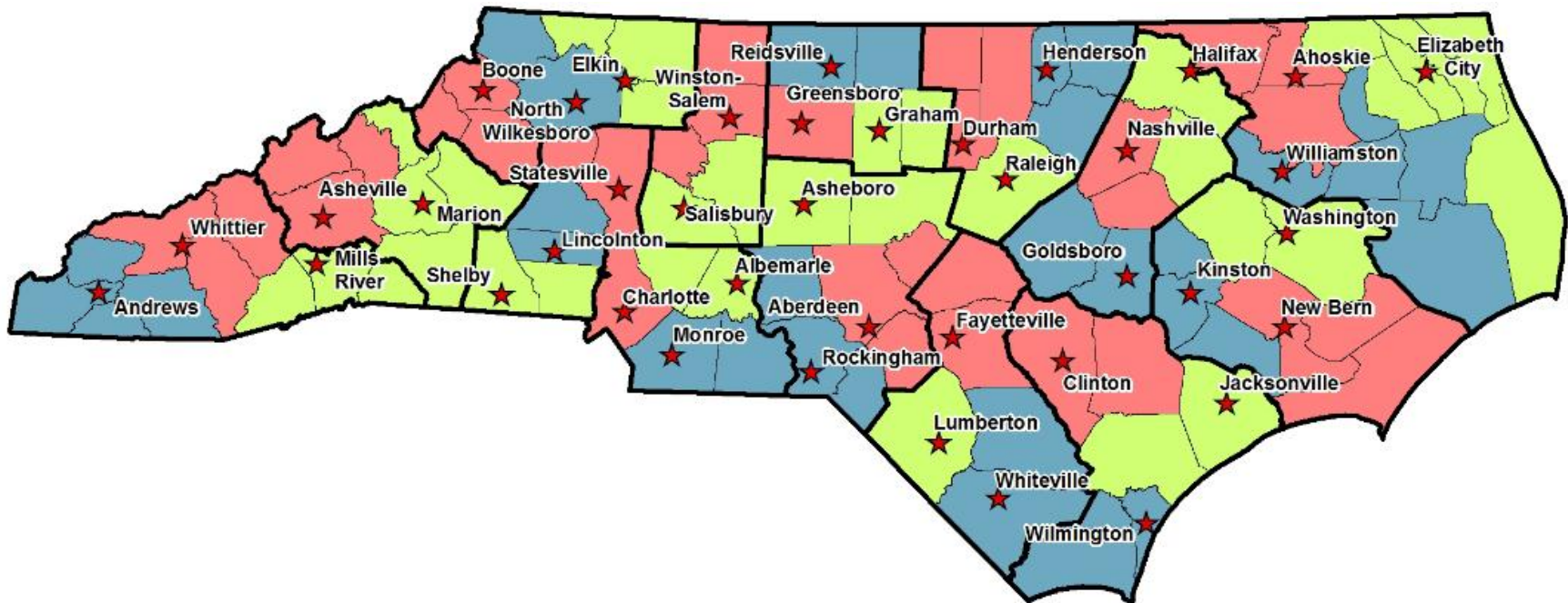
# Division Office Locations





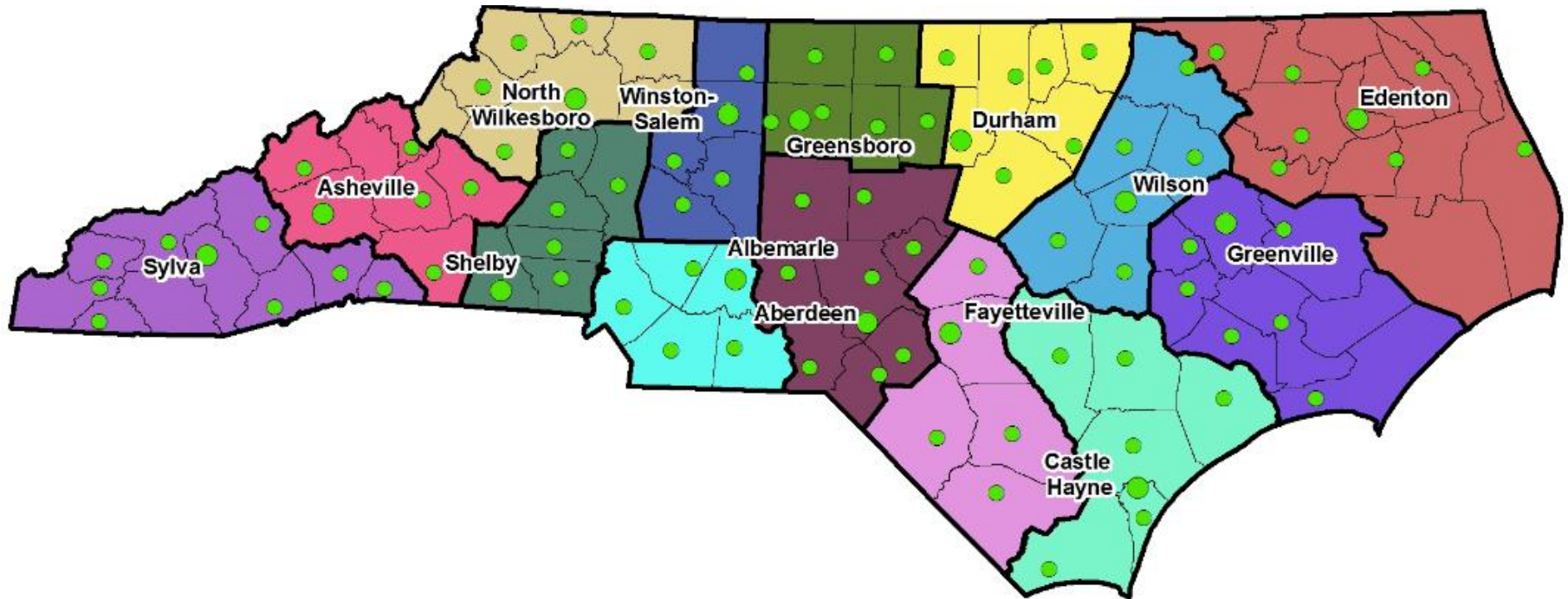


# District Office Locations





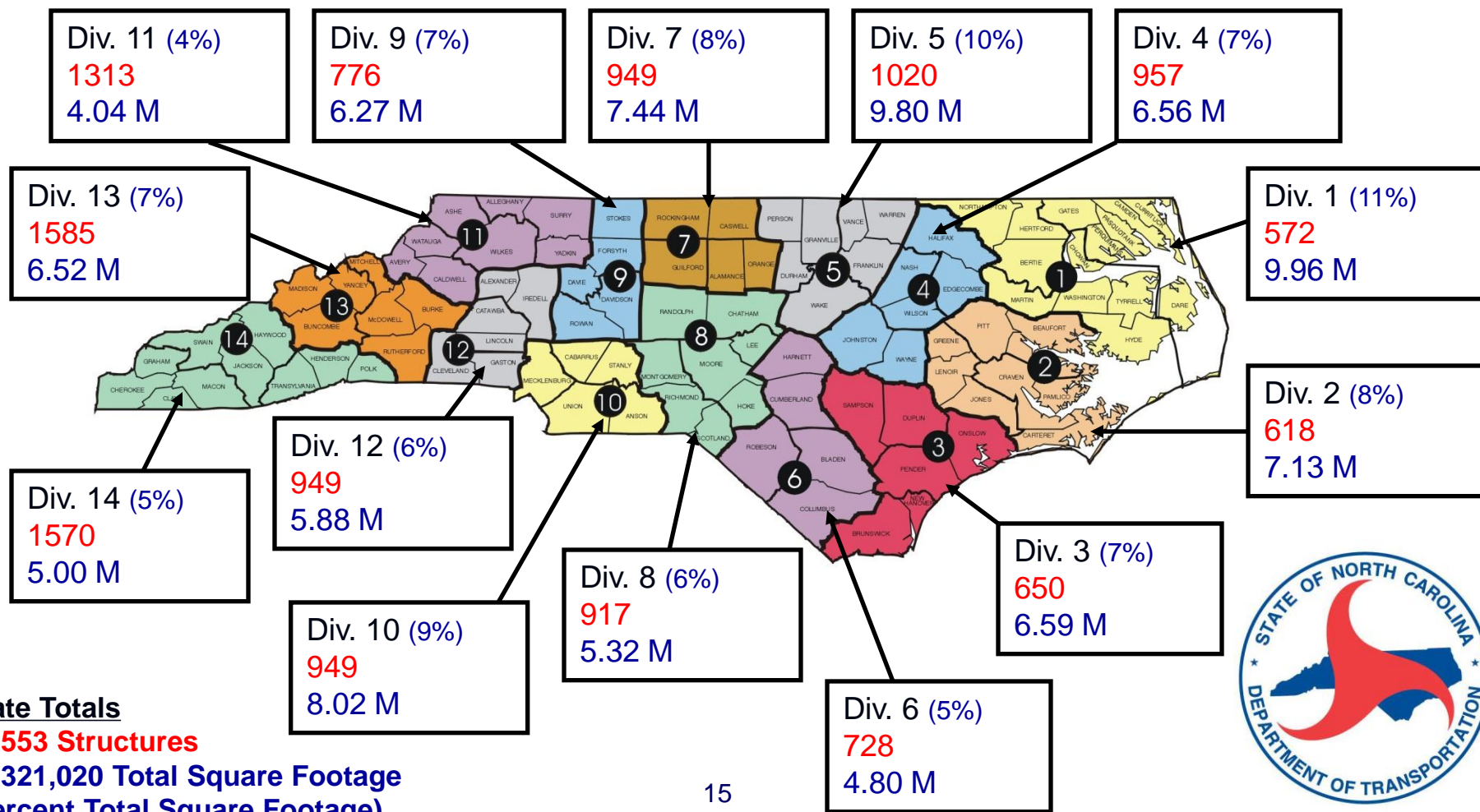
# County Maintenance Yard Locations





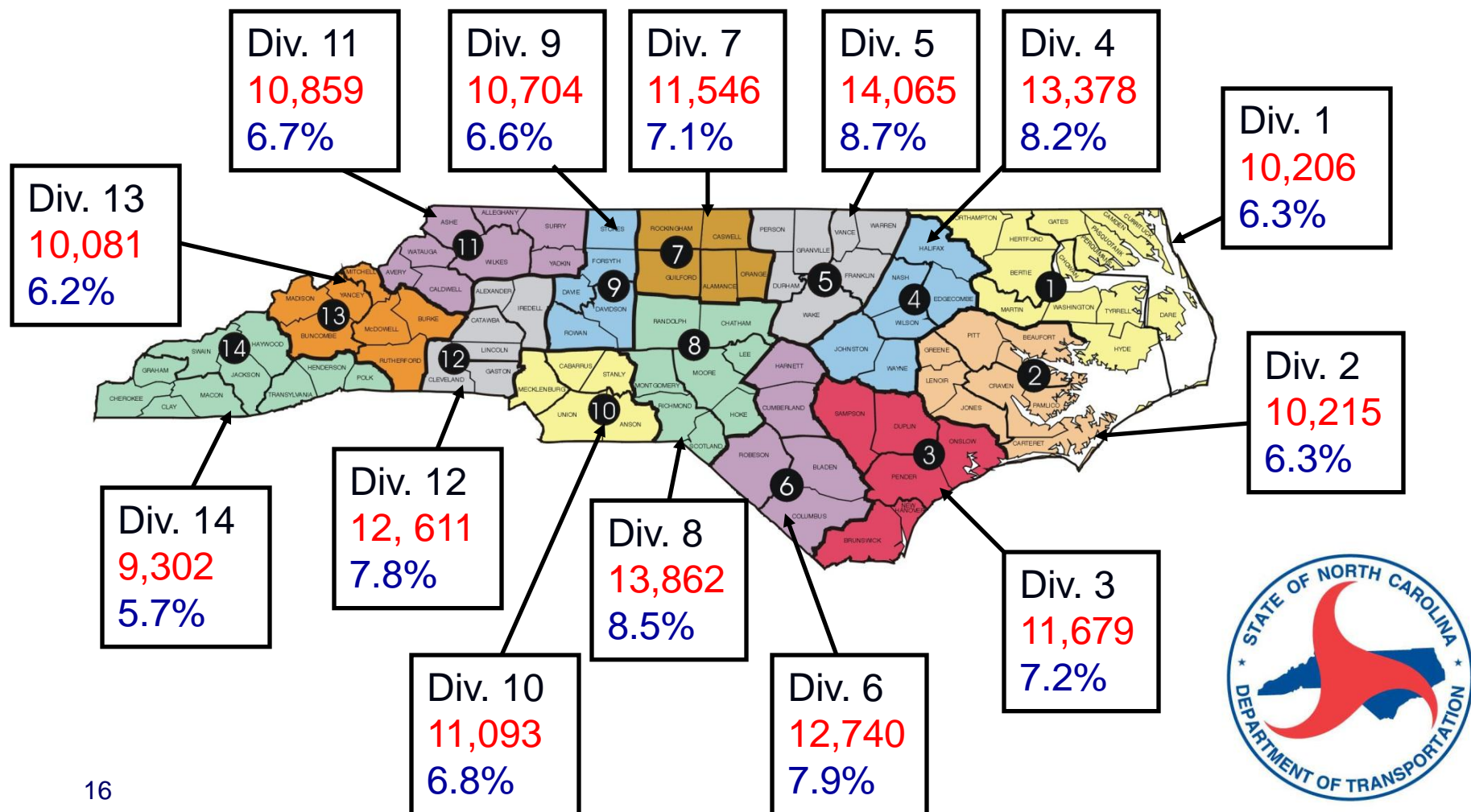


# Bridge Deck Surface Area per Division





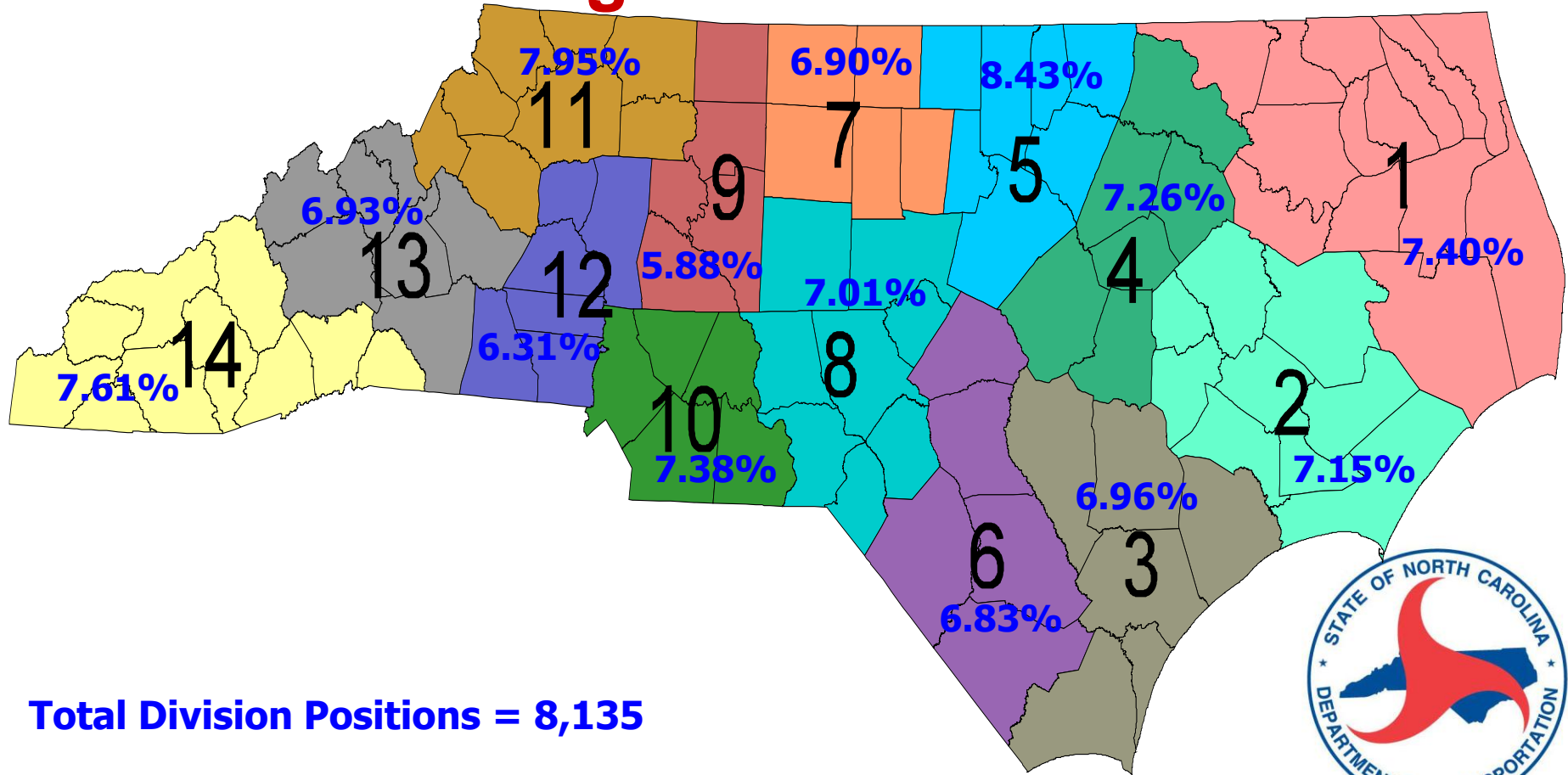
# Road Lane Miles



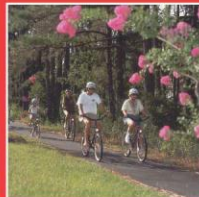
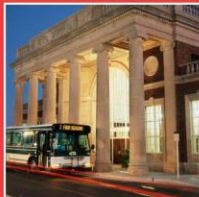
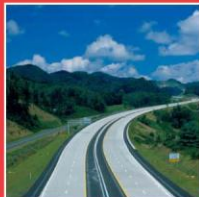




## Percentage of Total Positions



**Total Division Positions = 8,135**



# Employee Per Mile: State Comparison

State	Employees	Mileage	Employees per Mile
Maryland	10,779	5,148	2.09
Florida	6,971	12,084	0.58
Alabama	4,756	10,938	0.43
Mississippi	3,338	10,973	0.30
Pennsylvania*	11,466	39,862	0.29
Tennessee	4,068	13,881	0.29
Georgia	4,955	17,997	0.28
Louisiana	4,502	16,685	0.27
Missouri	6,114	33,677	0.18
North Carolina*	12,354	79,466	0.16
Texas	11,907	80,067	0.15
West Virginia	4,758	34,369	0.14
Virginia	6,808	57,918	0.12
US Average (based on 41 states reporting)	4,746	17,598	0.42



# Funding Allocations For Maintenance and Preservation

- State Funding
- Federal Funding
- Other Programs



# NCDOT - Division of Highways

## State Funding

- Highway Maintenance
- Contract Resurfacing
- System Preservation
- General Maintenance Reserve
- Secondary Road Construction







# Highway Maintenance

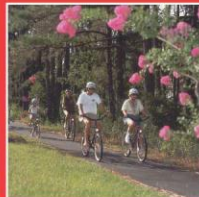
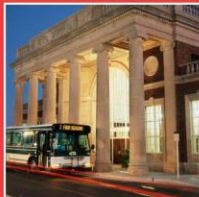
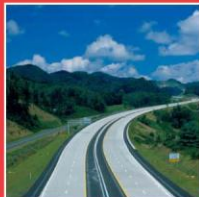
Revenue Source - Highway Fund

FY 2012 - \$453M (includes primary and secondary roads)

FY 2013 - \$385M (includes primary and secondary roads)

- Serves as primary funding source for all routine highway and bridge maintenance operations.
- Funds allocated to highway divisions in accordance with Board of Transportation approved formulas
- Disaster Response funding reserve \$15M
- Bridge funding \$70M: Allocation based on maintenance needs and number of deficient bridges





## Primary System

$$\text{Statewide Available Funds} \quad \times \quad \frac{\text{Division Lane Miles}}{\text{State Total Lane Miles}}$$

## Secondary System (Individual County Allocation)

**\$50,000 Uniform Allocation to each county**

$$90\% \quad \frac{\text{Total Available Sec. Maint. Funds}}{\text{Total Available Sec. Maint. Funds}} \quad \times \quad \frac{\text{County Road Miles}}{\text{State Sec. Rd. Miles}}$$

$$10\% \quad \frac{\text{Total Available Sec. Maint. Funds}}{\text{Total Available Sec. Maint. Funds}} \quad \times \quad \frac{\text{County Population}}{\text{State Population}}$$





# Contract Resurfacing

Revenue Source - Highway Fund

FY 2012 Appropriation - \$407M

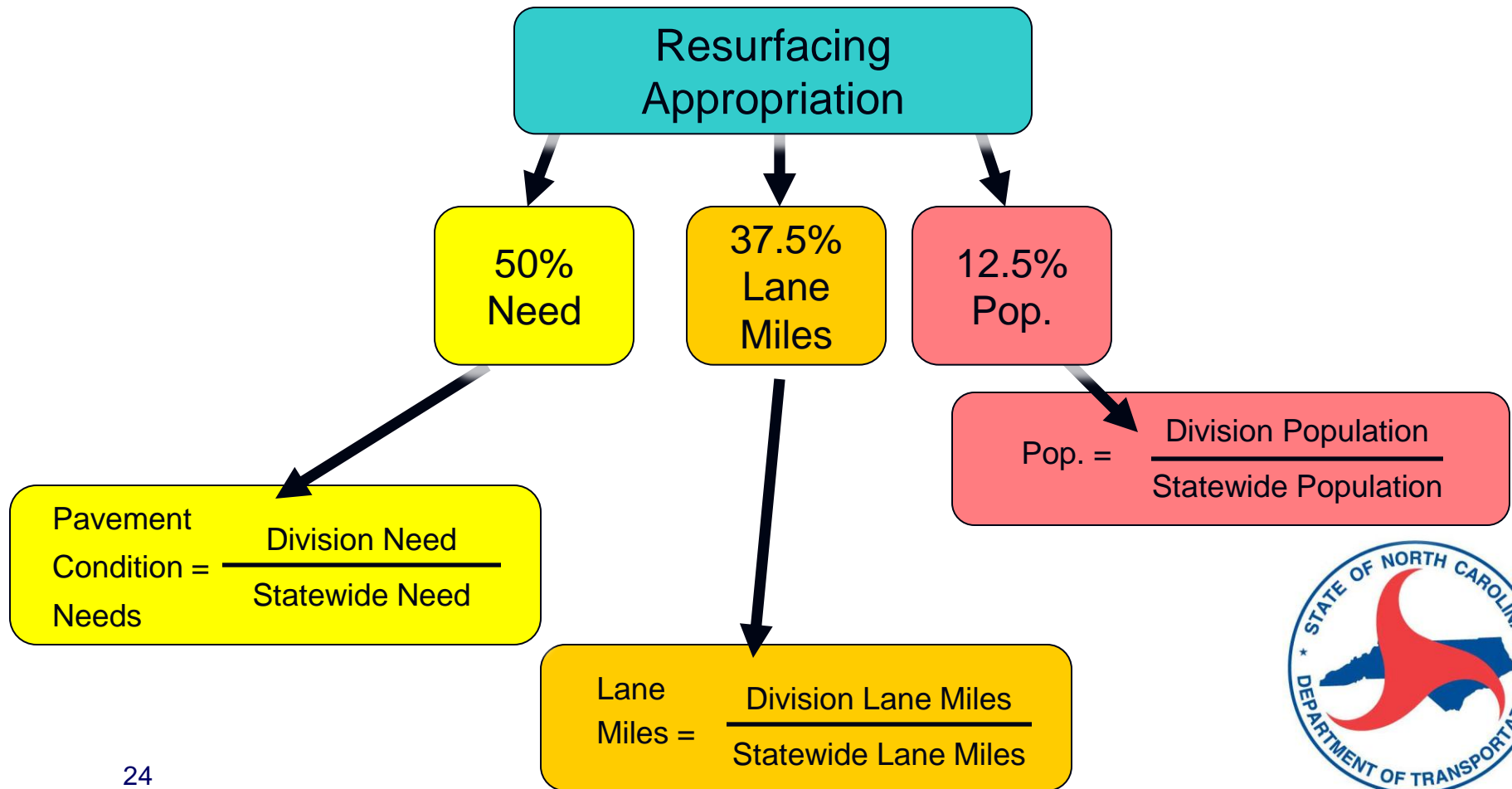
FY 2013 Appropriation - \$427M

- Statewide appropriation to DOT for asphalt overlays
- Performed by Contract
- Provide renewed driving surface and improved ride quality
- Reduces patching and frequent maintenance
- On average \$100K will resurface one mile of a two lane road





# Contract Resurfacing Allocation Formula for the Divisions







# System Preservation

Revenue Source – Highway Fund

FY 2012 Appropriation - \$214M (Primary and Secondary Bridge Improvement Program)

FY 2013 Appropriation - \$235M (Primary and Secondary Bridge Improvement Program)

For the last two years all System Preservation Funding was used exclusively for improvements on Structurally Deficient Bridges

## Historical Use of Funds

- Funds used for chip seals, crack sealing, pavement markings and markers, painting structural steel, replacing expansion joints and waterproofing bridge decks
- \$28 million allocated to Divisions based on pro-rata share of bridge deck area for bridge preservation activities (\$2M per Division)
- Remainder allocated to Divisions based on pro-rata share of total paved lane miles



# General Maintenance Reserve

Revenue source – Highway Fund

FY 2012 Appropriation - \$116M (Primary and Secondary)

FY 2013 Appropriation - \$140M (Primary and Secondary)

- Beginning in 1999, the General Assembly has provided additional maintenance dollars to help address maintenance needs identified by the Department's Maintenance Condition Assessment Program.
- These funds are used to supplement other maintenance dollars.
- These funds are allocated to the Divisions based on a pro-rata share of Division paved lane miles.





# Secondary Road Construction

Revenue Source – Highway and Highway Trust Fund

FY 2012 Allocations - \$95.2M (\$54.4M HF; \$40.8m HTF)

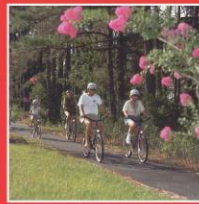
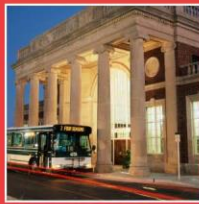
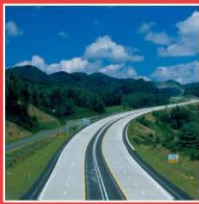
FY 2013 Allocations - \$75.5M (\$27.2M HF; \$48.3M HTF)

- Funds allocated to each county in accordance with G.S. 136-44.2A and G.S. 136-44.5
- Funds used to modernize the paved secondary system & pave unpaved roads
- For FY 2013, HB 950 required a paving priority based on a statewide list. \$12M was set aside for paving unpaved roads; 63.5M for paved road improvements

Allocation Formula:

$$\frac{\text{Total miles of secondary roads in County}}{\text{Total miles of secondary roads in State}}$$





# Secondary Road Construction

## Looking Forward

### Secondary Paved Road Improvements

- Consider authorizing the development and use of a prioritization process for secondary road improvements based on safety, mobility and access criteria.
- Consider allocating remaining Secondary Road Improvement Program funds, not used for paving unpaved roads, to this new program.
- Consider refining funding allocation criteria to address corridor improvements and isolated problem areas







# Secondary Road Construction

## Looking Forward

### Benefits:

- Focuses resources on projects of greatest need
- Allows resources to be focused on congestion and access mitigation
- Allows for multi-year and regional planning
- Potential to modernize key roadways to better link business centers and residential areas
- Increases flexibility to address safety issues, resulting in lower accident rates and fatalities

### Impacts:

- Funds following need, not inventory





# State Budget Allocation FY 2013 (Millions)

Highway Maintenance	\$ 385
Contract Resurfacing	\$ 427
System Preservation	\$ 235
General Maintenance Reserves	\$ 140
HB 1825 Secondary Road Improvement (Paved)	\$ 63
HB 1825 Secondary Road Improvement (Unpaved)	\$ 12

**Total** **\$ 1,262 Million**





# NCDOT - Division of Highways

## Federal Funding

- Traffic Operations
- Bridge Rehabilitation and Replacement
- Interstate Maintenance Preservation Program







# Traffic Operations

Revenue Source: Federal Funds and Highway Fund

Annual Appropriation \$43M (\$37M Federal, \$6M HF)

- Intelligent Transportation Systems (\$13M)
  - Message Boards, Cameras Speed sensors
- Positive Guidance (\$4M)
  - Pavement markings
- Traffic System Operations (\$20M fed, \$6M state)
  - Operations & Maintenance of signal systems





# Federal Bridge Program

## Preventative Maintenance (\$5M)

- Used to address bridges deck joint repair, deck overlays and painting

## Low Impact Bridge (\$28M)

- Used to replace small bridges that have low impact on environmental, right of way, utilities and the public

## Note: Other Bridge Replacement/Rehab (STIP ~\$300M)

- Rehabilitation and Replacements projects





# Interstate Maintenance Preservation Program

Revenue Source – Federal Funds

Annual Appropriation - \$10M

- Cost effective preventative activities to keep assets in “Good” condition
- Pavement, Bridge, and Positive Guidance assets
- Allocation to each Division is based on Lane Miles and Bridge Deck Area







# Federal TIP Funding for Maintenance and Preservation Federal Fiscal 2013 (Millions)

ITS Traffic Operations	\$ 13
Positive Guidance Program	\$ 4
Traffic Systems Operations Program	\$ 26
Bridge Preventative Maintenance Program	\$ 5
Low Impact Bridge Replacement	\$ 28
Interstate Maintenance Preservation Program	\$ 10

**Total \$ 86 Million**





# NCDOT - Division of Highways

## Other Programs

- Access and Public Service
- Highway Safety
- Roadside Environmental





# Access & Public Service Fund

Revenue Source - Highway Fund

FY 2012 Appropriation - \$1.8 Million

FY 2013 Appropriation - \$1.8 Million

- Funds used statewide to construct bus driveways and bus parking areas for new schools and construct new access roads or improve existing access for new industry
- Pave Driveways for new Fire and Rescue facilities
- Funds may be used on any system







# Highway Safety Fund

Revenue Source - Highway Fund and Federal Aid

FY 2012 Appropriation – 47.1M (\$12.1M HF and \$35M Federal aid)

FY 2013 Appropriation – 73.1M (\$12.1M HF and \$61M Federal aid)

- Funds used statewide on all systems to provide safety and operational improvements
- Typical projects include traffic signals, turn lanes, guardrail and signing
- Projects considered based on accident history and severity, traffic volumes and signal warrants
- Projects are prioritized by benefit/cost ratios





# Roadside Environmental

Revenue Source: Federal Funds, Highway Fund, License Plate  
Annual Allocations - \$11.7M (\$8.2m Federal, \$3.5M State Funds)

- Roadside Environmental provides:
  - Administration of the Department's Sedimentation/Erosion Control Program for Construction/Maintenance projects
  - Stormwater compliance activities for Department's National Pollution Discharge Elimination System (NPDES) Program Permit
  - Rest area maintenance/preservation/construction/renovation
  - Roadside Vegetation Management
  - Roadside Landscape Design and Plantings
  - Roadside Litter Prevention and Removal Program
  - Scenic Byways Program





## Other Program Allocations Fiscal Year 2013 (Millions)

Access and Public Service	\$ 1.8
Highway Safety Program	\$ 73.1
Roadside Environmental	\$ 11.7
<b>Total</b>	<b>\$ 86.6 Million</b>







- Validating Funding Distribution
- *Outcome based performance measurement*



# Performance Based Management

## Benefits include:

- Moving towards uniformly constructed, maintained and operated Highway System
- Data driven decision making
- Increased focus on preventive maintenance
- Targeting Level Of Service by system
- Highest and best use of resources
- Challenging and rewarding workplace
- Accountability





# Performance Measures

## Sets clearly defined outcomes such as:

- No unsealed cracks in pavements
- Bridge decks rating in good condition
- No pipes blocked or damaged
- Pavement markings visible at night

## Since 2008:

- Reviewed targets to ensure accuracy
- Made modifications as necessary
- Simplified and streamlined







# Rating the Condition of the Highway System



Maintenance Condition  
Survey



Bridge Condition  
Survey

Pavement Condition Survey





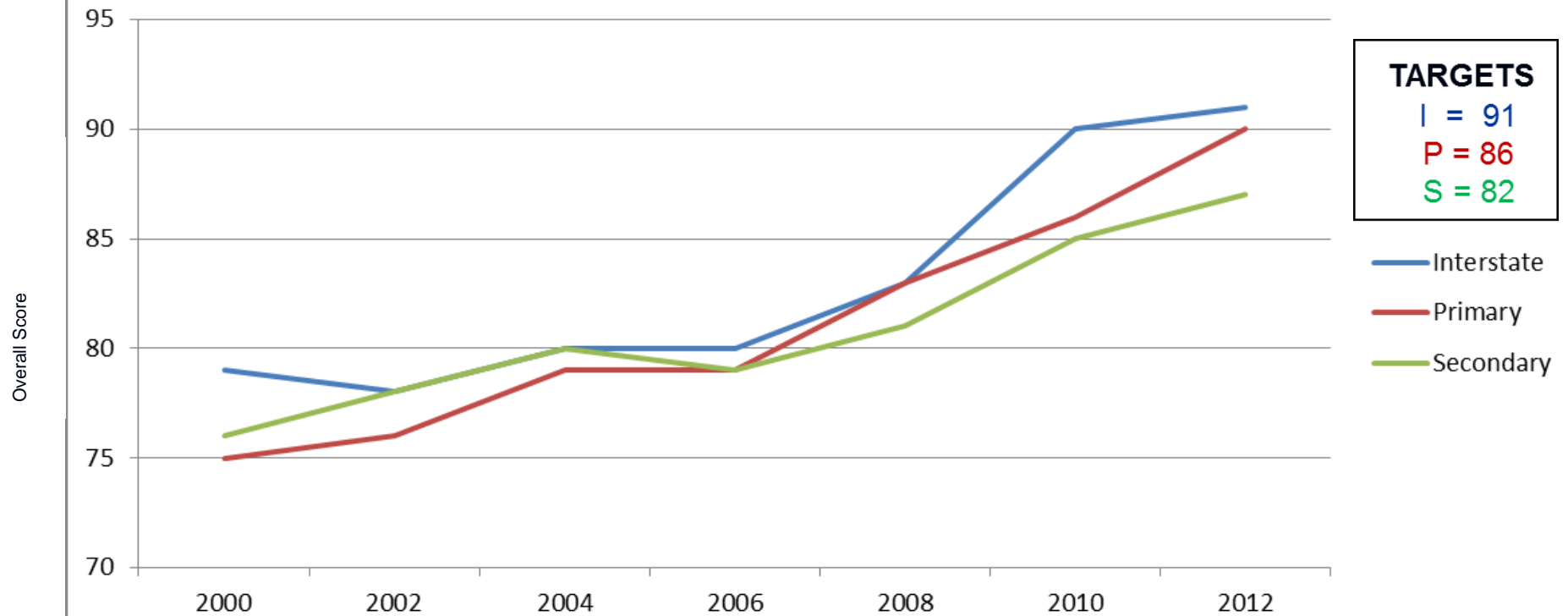
# Maintenance Condition Survey Results

Roadway			Interstate		Primary		Secondary	
			2012	State Average	2012	State Average	2012	State Average
	ELEMENT	PERFORMANCE MEASURE	Target	Score	Target	Score	Target	Score
DRAINAGE	Unpaved Shoulders	No dropoffs greater than 3 inches and no shoulders higher than 2 inches	95	92	90	92	85	93
	Ditches (Lateral Ditches)	No blocked, eroded, or nonfunctioning ditches	95	99	90	97	85	96
	Crossline Pipe (Blocked)	Greater than 50% diameter open	95	87	90	81	85	82
	Crossline Pipe (Damaged)	No damage or structural deficiency effecting functionality	95	91	90	97	85	96
	Curb & Gutter (Blocked)	No obstruction greater than 2 inches for 2 feet	95	96	90	97	85	97
	Boxes (Blocked or Damaged)	Grates and outlet pipes of boxes blocked <50%. Inlets and outlets of boxes are not damaged, and grates are present and not broken.	95	84	90	90	85	92
ROADSIDE		Freeways: 45' from travelway, 5' behind guardrail, not blocking signs; Non-Freeways: Vertical clearance of 15' over roadway and 10' back of ditch centerline or shoulder point	90	92	85	90	80	86
	Vegetation (Brush & Tree)							
	Vegetation (Turf Condition)	Areas free of erosion	95	91	90	94	85	94
	Stormwater Devices (NPDES)	Functioning as designed	90	94	90	94	90	94
	Landscape Plant Beds	Achieving a score of 2 or higher on the inspection form	90	90	80	90	N/A	N/A
	Rest Areas & Welcome Centers	Condition Rating of 90	90	96	90	93	N/A	N/A
TRAFFIC	Long Line Pavement Markings	Present, visible	90	96	85	94	80	88
	Words and Symbols	Present, visible	N/A	N/A	85	87	80	85
	Pavement Markers	Present and reflective	90	91	85	81	N/A	N/A
	Ground Mounted Signs	Visible and legible	90	94	85	94	85	89
	Overhead Signs	Visible and legible	92	99	85	97	N/A	N/A
BRIDGE	NBIS Culverts	Condition Rating $\geq 6$	85	86	80	87	75	89
	Non-NBIS Culverts	Condition Rating = Good	80	81	70	72	60	56
	Overhead Sign Structures	Condition Rating = Good	95	88	92	93	92	84
45	Totals		91.32	91.43	86.16	90.27	82.16	87.43





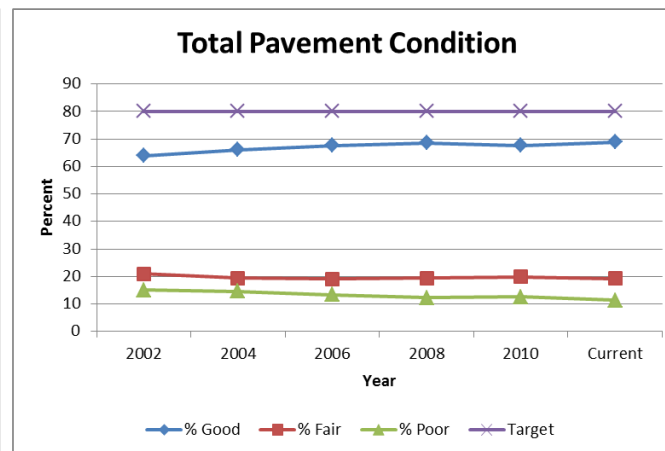
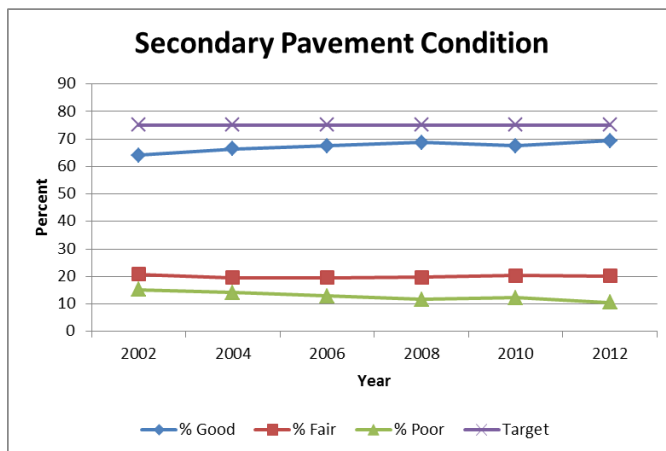
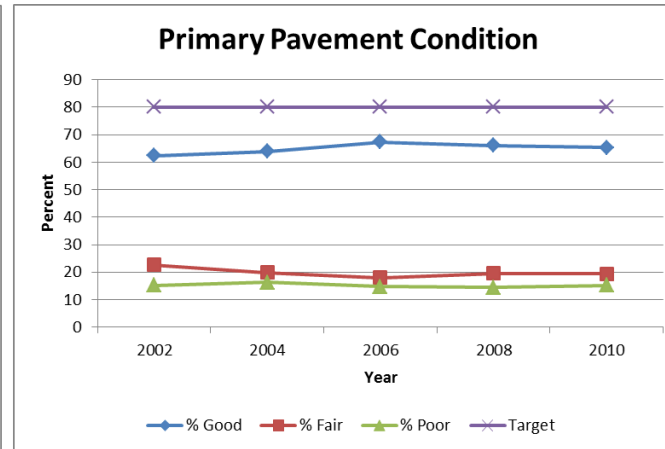
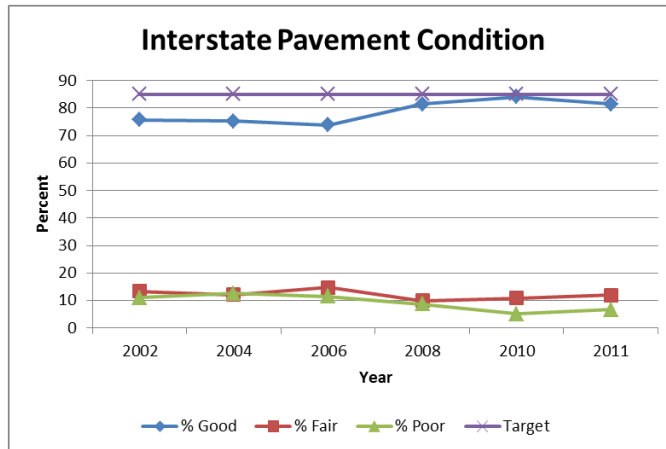
## Performance Measure Trends (Maintenance Condition Survey Results)







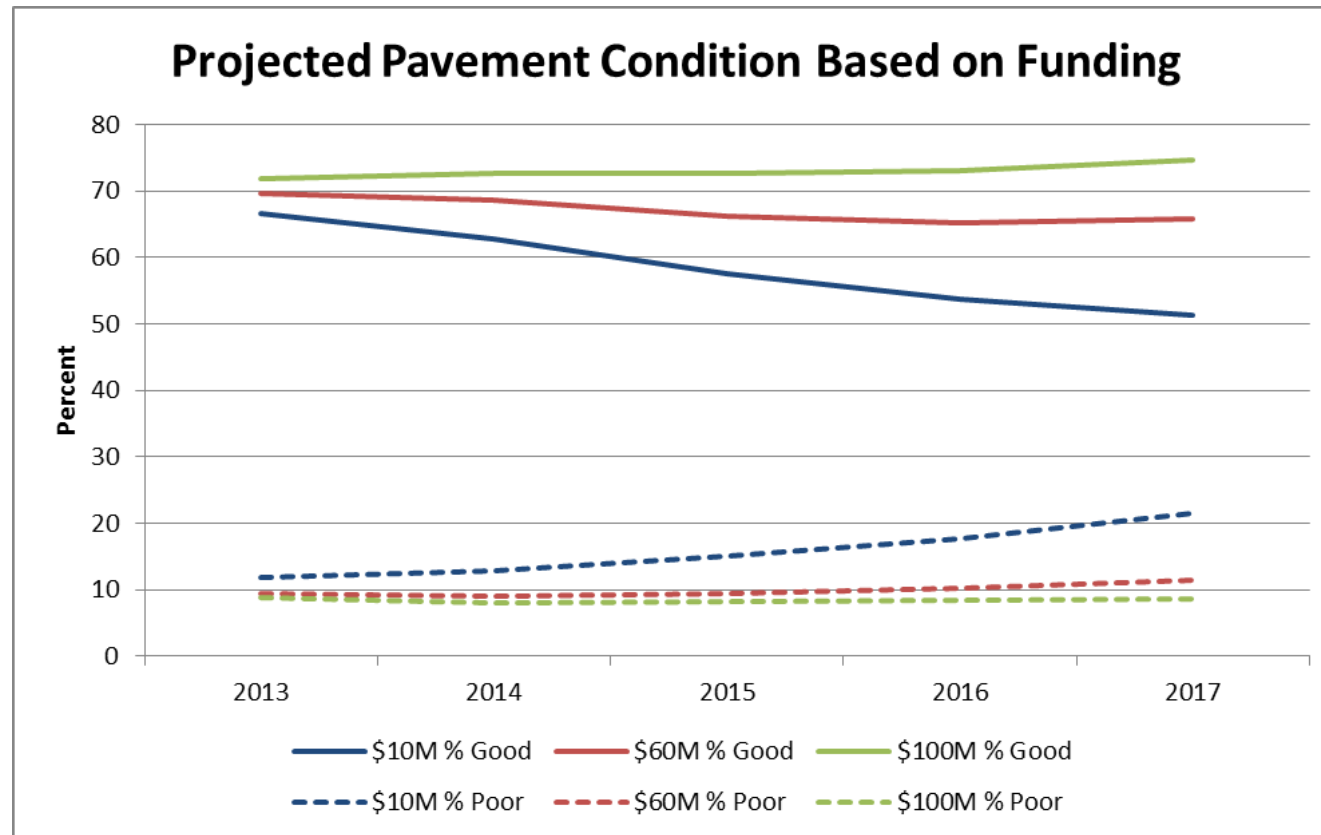
# Pavement Condition (2002 – 2012)





# Effect of Lack of System Preservation

## Funds on Pavements





# Infrastructure Health Index

- Calculates an overall system score
- Measures NCDOT's success for maintaining and improving the health of the highway network

## Weights asset categories:

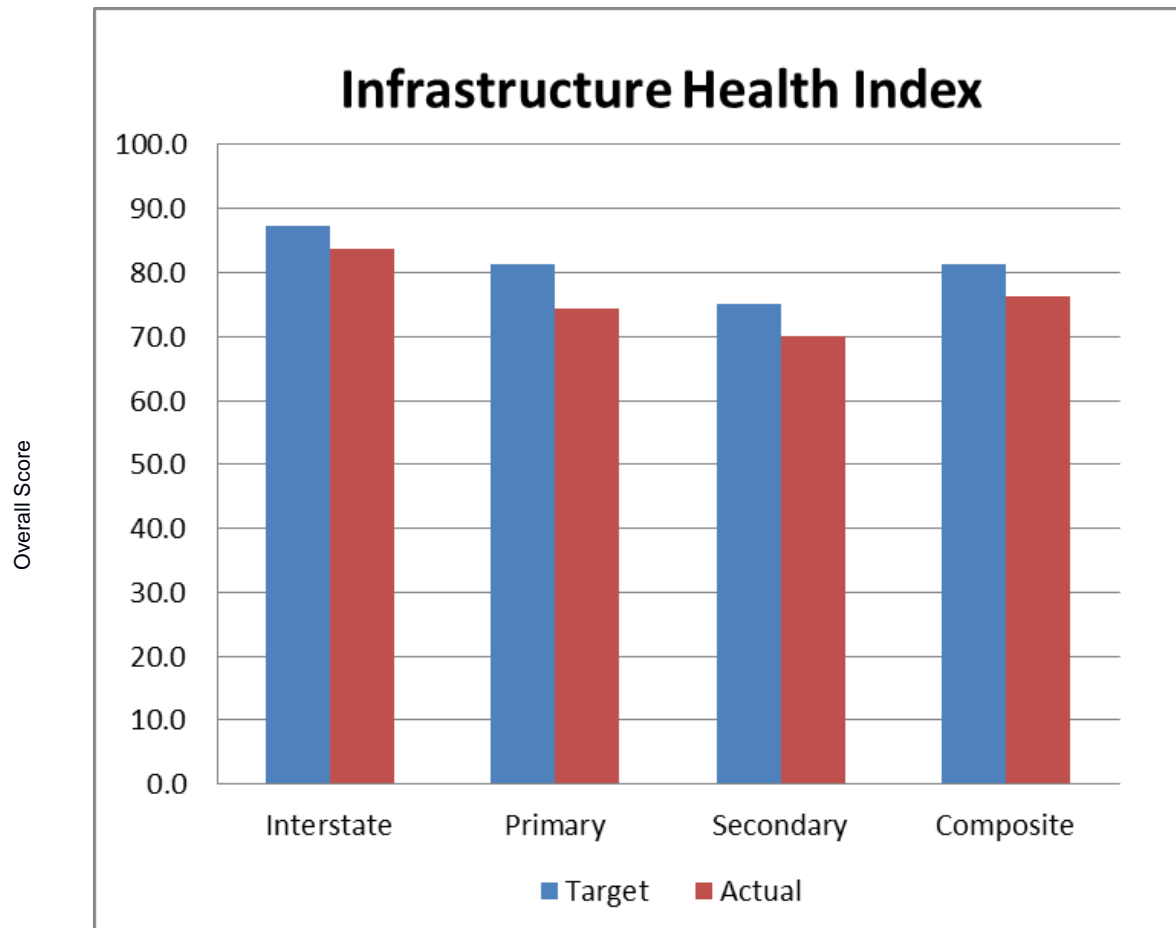
- 25% for roadsides features
- 35% for bridges
- 40% for pavements







# Infrastructure Health Index





# Validating Performance Measures

- Public told us:
  - Interstate: Meeting expectations with no areas of concern
  - Primary: Meeting expectations and identified shoulders as an area of concern
  - Paved Secondary: Slightly below expectation and focus areas include pavement condition, smoothness, width of travel lanes, roadway striping and markers





# Maintenance Funding Needs FY 2013-2014 (Millions)

	<u>Needs</u>
• Maintenance Operations	\$ 765.97
• Disasters	\$ 15.00
• Contract Resurfacing	\$ 427.16
• <u>Pavement and Bridge Preservation</u>	<u>\$ 195.59</u>
<b>Total Maintenance and Preservation Needs</b>	<b>\$ 1,403.72</b>
 Alternate Maintenance Funds	 - \$ 152.00
<b>Adjusted Maintenance Funding Needs</b>	<b>\$ 1,251.72</b>
 <b>System Rehabilitation Needs</b>	 <b>\$ 320.81</b>







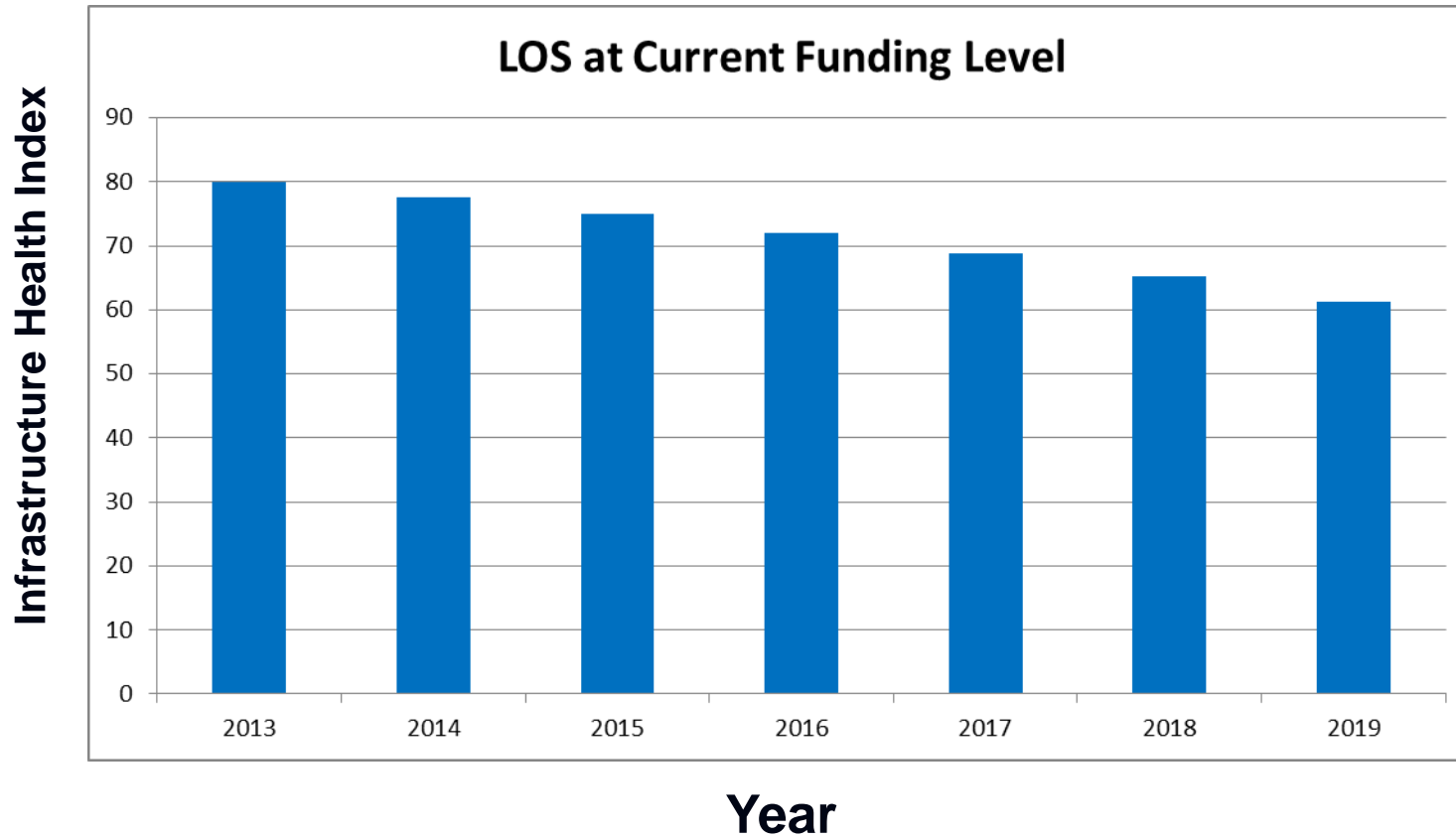
# Statewide Annual Maintenance Funding Plan

Fiscal Year (\$ millions)					
Maintenance Programs	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Maintenance and Operations	765.97	792.01	818.94	846.79	875.58
Disasters/Emergencies	15.00	15.00	15.00	15.00	15.00
Contract Resurfacing	427.16	441.68	456.70	472.23	488.28
Pavement and Bridge Preserv	195.59	202.24	209.12	216.23	223.58
Total Maint. Funding Needed	<b>1,403.72</b>	<b>1,450.35</b>	<b>1,498.55</b>	<b>1,548.40</b>	<b>1,599.94</b>
Supplemental Maint. Funds	152.00	152.00	152.00	152.00	152.00
Estimated Maint. Fund Allocation	<b>\$ 1,188.18</b>	<b>\$ 1,248.90</b>	<b>\$ 1,309.59</b>	<b>\$ 1,317.58</b>	<b>\$ 1,413.24</b>
<b>Shortfall</b>	<b>(63.54)</b>	<b>(49.45)</b>	<b>(36.96)</b>	<b>(78.82)</b>	<b>(34.70)</b>



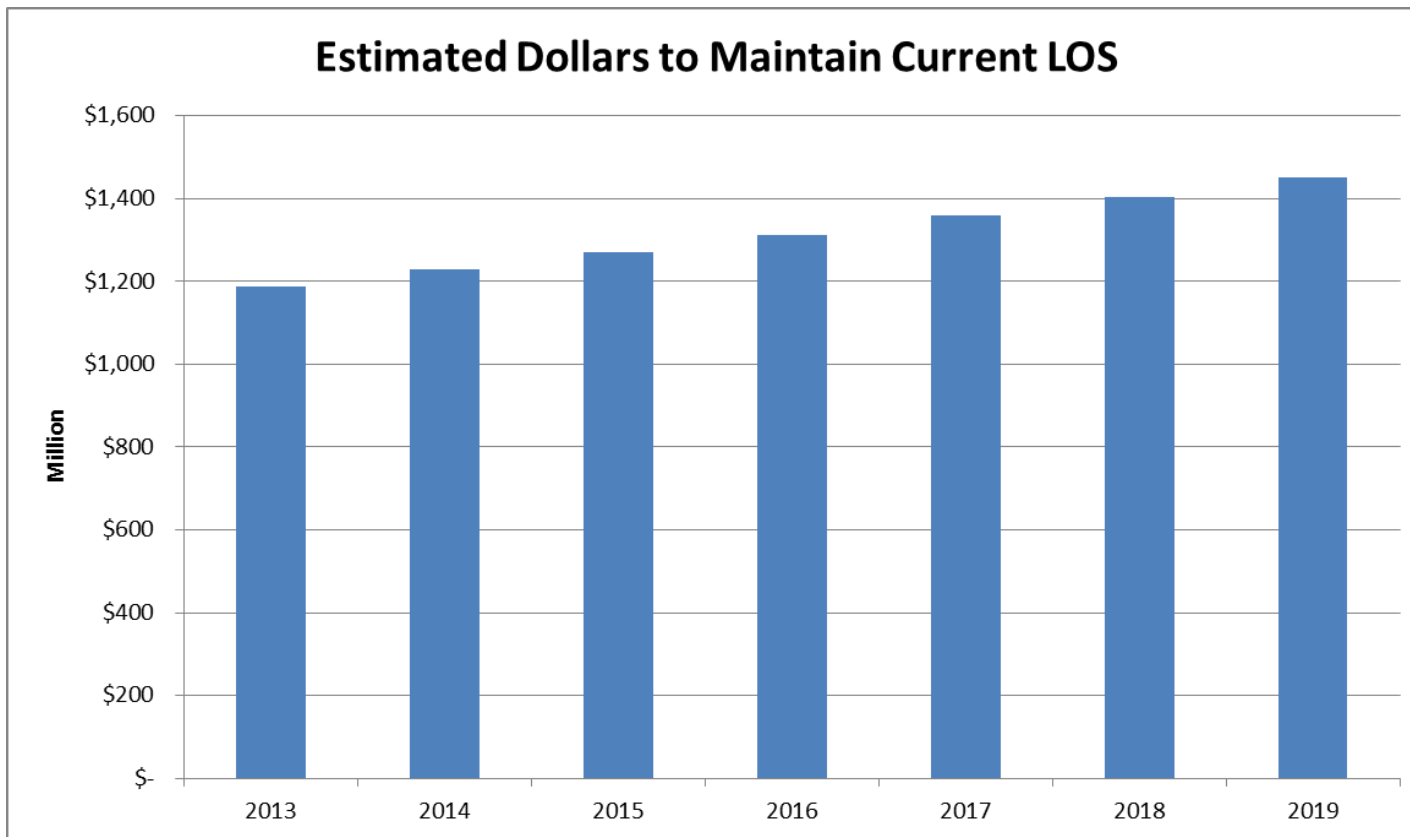


# LOS at Current Funding Level





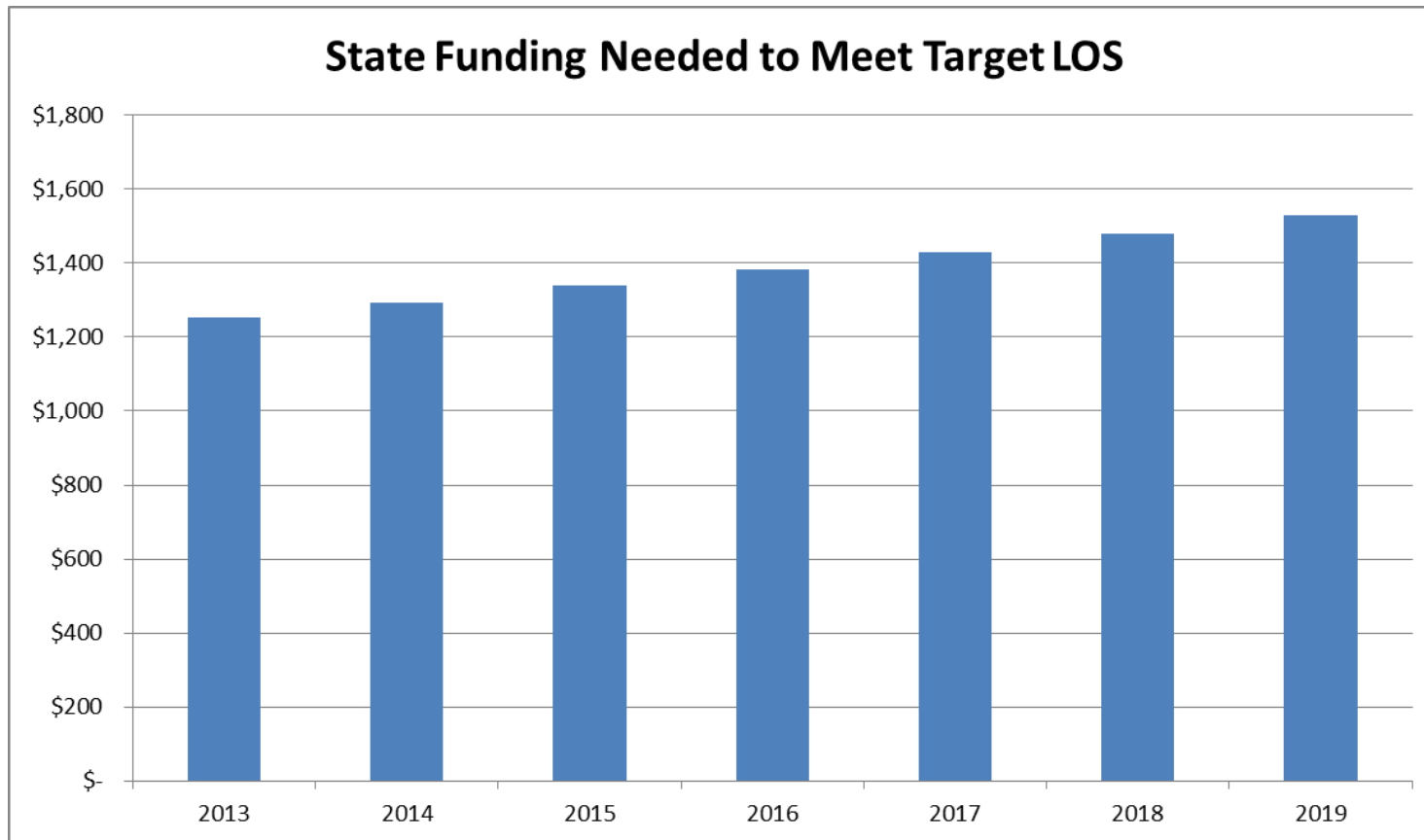
# Estimated Dollars to Maintain Current LOS







# State Funding Needed to Meet Target LOS





## Summary

- Meeting targets on roadside features
- Pavements and bridges are trending in the right direction
- Public validation of targets
- Funding only slightly below need
- Need more flexibility in funding
- Flexible funding allows NCDOT to address differing needs across all geographic areas of the State to maximize the return on investment.





# Questions?